

Sensitivity Analysis Study of a Large-scale Air Pollution Model - Computational Problems and High-performance Solutions

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Variance-based sensitivity analysis methodology has been developed for a quantitative study of some internal parameters contribution into the output results of a large-scale air-pollution model, the Danish Eulerian Model. A large number of numerical experiments with the model must be carried out in order to collect the necessary input data for a particular sensitivity study of calculated ozone concentrations with respect to variations of rates of some chemical reactions. These reactions are taken from the CBM-4 scheme for air-pollution chemistry, incorporated in UNI-DEM.

Two high performance approaches are applied to this huge computational problem: three-level parallelization and GRID computing. Numerical results and analysis of both implementations will be presented in the talk.